

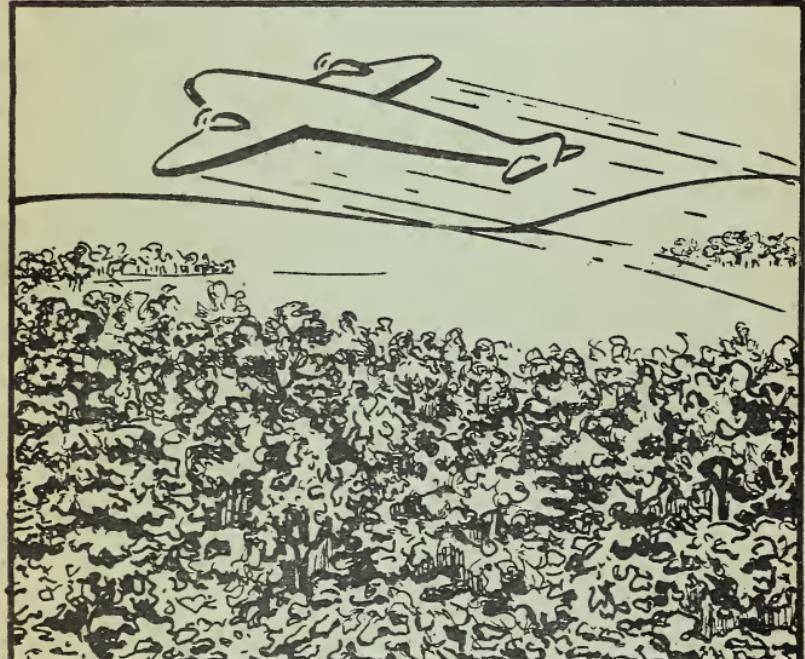
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EC-8

The NEW COOPERATIVE GYPSY MOTH CONTROL PROGRAM



BUREAU OF
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THE NEW COOPERATIVE GYPSY MOTH CONTROL PROGRAM

The gypsy moth and the brown-tail moth can now be controlled with single applications of DDT. Such control has been made possible by the development of new methods of treatment utilizing new types of equipment, and accomplished through organized cooperative programs. The cost has been far less than any previous programs for control of these pests, and there has been no injury to domestic animals or wildlife.

Aircraft has contributed largely to the success of these programs. Airplanes are used to spray DDT over large forest areas. Small airplanes can treat about 250 acres of woodland per hour, and in 1948 a C-47 plane operated by the Bureau sprayed 1,800 acres in an hour. The cost per acre of all aircraft spraying in 1948 was less than one dollar.

Newly designed mist blowers operated from the ground have also been used extensively in the last few years. These blowers are used to apply DDT to trees and other host plants in residential areas and along highways. One of the new mist blowers can treat in one season about ten times the area that can be sprayed with one of the conventional hydraulic sprayers. The average cost for spraying with mist blowers in 1948 was 60 cents per acre.

The success of these new methods has renewed interest in the control of these moths throughout the older infested sections of New England. State and

local agencies, even individuals, are increasing their efforts to prevent damage from these pests. Modern equipment is being acquired. Many commercial spray operators are now using mist blowers for applications from the ground, and some are equipped with airplanes for woodland spraying.

Information is given in this circular for the benefit of communities and individuals who wish to know how to utilize these new methods for control of these pests. The objectives and accomplishments of gypsy moth control programs conducted cooperatively by the Bureau of Entomology and Plant Quarantine with the States where this pest occurs are also summarized.

Present Distribution

The gypsy moth is present throughout New England except in the northern portions of Maine, New Hampshire, and Vermont and in the southwestern part of Connecticut. Infestations also occur in eastern New York. Spraying of the older established infestation near the Scranton-Pittston-Wilkes-Barre area was completed in 1948, and no moths have been found since that time. A small area in Pennsylvania that was found infested for the first time in the fall of 1948 has now been sprayed and the infestation has apparently been cleaned up. The infestation in New York State is in a 200-mile-long, bulge-shaped area bordering the New England States. This and the adjacent area in western New England is known to gypsy moth control leaders as the suppressive area. This

moth has defoliated as many as 800,000 acres of forestlands in a single season. Repeated defoliation kills trees, and only a small portion of the timber can be salvaged.

The brown-tail moth occurs in only a small portion of the area infested with the gypsy moth. It is found in Maine, New Hampshire, and Massachusetts, being most abundant and persistent near the coast. It is a very obnoxious pest, however, as tiny hairs from the caterpillars float about in the air and cause severe skin infections in man.

Recommended Control Procedures

Formulations.--DDT sprays may be applied as oil solutions, emulsions, or suspensions. However, oil solutions have been used most in the Federal-State cooperative program. The new equipment is designed to utilize special concentrated solutions. Two formulations are used in the cooperative program--(1) a 12-percent solution prepared from 1 pound of technical DDT, 1 pint of xylene, and 7 pints of kerosene; and (2) a 6-percent solution made by dissolving $\frac{1}{2}$ pound of technical DDT in 1 gallon of kerosene. No. 2 fuel oil is sometimes used instead of kerosene. The solutions are prepared on the job. In preparing formula (1) the kerosene is placed in the mixing tank first and the xylene and DDT are added in the order named, with continuous stirring. The oil should be heated to about 80° F., but not above 100°, during the mixing and until supplied to the spray tanks.

Except in large-scale operations, most people will prefer to use proprietary DDT insecticides. If such preparations are used, the directions furnished on the container should be followed closely.

These DDT formulations kill many other forest and shade-tree insects besides the gypsy and brown-tail moths. Mosquitoes, flies, ticks, and many other insect pests that annoy man and animals are also controlled by this insecticide, and many communities are using DDT for this purpose.

Rate and Time of Application.--DDT sprays are effective against the caterpillars of gypsy and brown-tail moths. They will not kill the pupae or adults.

One properly timed application is effective for an entire season. Gypsy moths overwinter in the egg stage and brown-tail moths as partially grown caterpillars. Applications when the gypsy moth eggs are hatching, usually during May and June, will also kill the young brown-tail moth caterpillars. At this time the 12-percent solution is used at the rate of 1 pound of DDT (or 1 gallon of solution) per acre. If any further spraying is necessary after the gypsy moth eggs have hatched or the brown-tail moth caterpillars have left their nests, the 6-percent solution is applied at the rate of $\frac{1}{2}$ pound of DDT (or 1 gallon of solution) per acre. The 12-percent solution has a longer residual effect than the 6-percent solution. From 30 to 40 shade trees 50 feet high are equivalent to 1 acre of woodland.

Equipment for Aircraft Spraying--

Several types of insecticide-distributing apparatus for use on aircraft have been developed by the Bureau's Division of Gypsy Moth Control at Greenfield, Mass. Details pertaining to such installations are given in circular EC-2, entitled "Aircraft for Spraying and Dusting" issued by this Bureau in March 1948. Similar devices are described in another leaflet, entitled "Aerial Spray Equipment for a Stearman N2S Airplane," issued as Information Series No. 87 by the Bureau of Plant Industry, Soils, and Agricultural Engineering in August 1948.

For extensive spray programs specially constructed mixing and storage tanks are needed. Hydraulic sprayers and tanks with capacities ranging from 600 to 4,000 gallons are adapted for this purpose. Details for the use of such auxiliary equipment can be obtained from the Bureau's Division of Gypsy Moth Control.

Before the spray season starts the boundaries of woodland to be sprayed are marked and the acreages determined. Aerial or U. S. Geological Survey maps showing plot boundaries, acreages, priorities, and locations requiring special attention are prepared for the guidance of pilots and for reporting the progress of the work.

Windsocks on wooden poles 10 to 15 feet long can be attached to the tops of tall trees to guide plane pilots. Special poles made of light-weight metal, in $5\frac{1}{2}$ foot sections with locking devices at each joint, have also been used as markers. They can be forced through the

treetops and secured there from the ground. Small glass plates are distributed on the ground before an area is sprayed, so that the deposit and dispersion of the insecticide can be determined. These plates are collected, examined, and cleaned daily. All locations where the plates show insufficient deposit are sprayed again.

Installations of insecticide-dispersing apparatus in aircraft must be such that license to fly the aircraft and waivers for low flying over congested areas may be obtained from the Civil Aeronautics Administration. Some States require permits from State aeronautic associations for spraying from aircraft. Consent of local authorities may be necessary for low flying over municipalities or populated areas.

The public should be notified in advance of all spraying by aircraft. In the cooperative spray programs personal interviews with State, county, and local officials, and frequently with owners of private property, are supplemented by announcements in local newspapers and in some cases over the radio. Such contact and notifications promote a general understanding of the work, its needs and accomplishments.

Mist Blowers.--Mist blowers, which operate from the ground, direct the insecticide into a rapidly moving air stream, which disperses the atomized spray. For gypsy moth control these blowers are set to deliver approximately 45 gallons of concentrated spray per hour when used at a pump pressure

of 40 pounds per square inch. A blower mounted on a truck disperses the recommended dosage of 1 gallon of spray per acre when the truck is driven at a speed of 2 miles per hour. For this work blowers have the following advantages over conventional hydraulic sprayers:

- (1) The cost of operation is greatly reduced.
- (2) The finely atomized spray settles very lightly and evenly over the treated area.
- (3) Spraying trees along highways and in residential areas causes less annoyance to traffic and the public.

Uses for Conventional Sprayers.--

The conventional hydraulic sprayers, however, are still useful in many spray programs. Five-gallon knapsack sprayers or fire pumps fitted with adjustable nozzles may be used in residential areas for spraying low growth along stone walls and fences and in nurseries.

DDT IS A POISON. USE IT CAUTIOUSLY. STORE IT IN PLAINLY LABELED CONTAINERS. AVOID CONTINUOUS EXPOSURE TO OIL SOLUTIONS OR EMULSIONS. DO NOT USE OIL SPRAYS NEAR FIRES, AND PROHIBIT SMOKING NEAR MIXING AND STORAGE TANKS.

**Objectives of Federal-State
Cooperative Program**

The eradication of the gypsy moth from this country is the ultimate goal of the Federal-State sponsored cooperative program. The objectives are as follows:

(1) First, eradicate the pest in Pennsylvania.

(2) Next, eliminate it west of the Hudson River in New York State, and finally from the State entirely.

(3) Then apply control and eradication measures against the gypsy moth in western New England to prevent it from spreading westward.

(4) By enforcing prescribed quarantine regulations prevent long-distance spread of either the gypsy moth or the brown-tail moth into areas cleared of the pests by eradication measures and into all uninfested areas.

(5) Encourage general use of new methods of control throughout infested portions of New England by demonstrating these methods with airplanes and mist blowers.

Accomplishments of the Cooperative Program

Failure to find a single living gypsy moth in the Scranton-Pittston-Wilkes-Barre area of Pennsylvania since spray applications were completed in 1948 indicates that eradication may already have been attained there. A total of 135,385 acres, or 211 square miles, were sprayed there by aircraft in 1948 alone. Other large areas were sprayed in New York, Vermont, Massachusetts, and Connecticut.

All areas sprayed with DDT have been under survey each year since 1944. In 1948 improved types of traps containing sex attractant were placed on more than 6 million acres in or near the

zones of active control in New York, New England, Pennsylvania, and in areas previously infested in New Jersey and New Brunswick, Canada. The only gypsy moths recovered in areas sprayed by aircraft were a few in New York State near the borders of untreated infested areas.

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